Ecological Sustainable Healthcare at the Hospital of the University of Pennsylvania

Audit, Education, Motivation

by

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ABSTRACT

Ecological Sustainable Healthcare at the Hospital of the University of Pennsylvania
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Objective: The purpose of this project is to enhance the green healthcare and sustainable medicine practices in the Hospital of the University of Pennsylvania Department of Emergency Medicine.

Methods: The Green Team, consisting of staff members from various departments throughout the hospital, met on a weekly basis to discuss and implement new green changes and initiatives. The Green Healthcare Audit forms, obtained from the Teleosis Institute, were utilized to evaluate the hospital's current performance and the information gained has guided and will continue to guide the Green Team in their efforts to make effective changes.

Categories of the Green Healthcare audit include:

- Solid Waste Reduction Recycling
- Energy Conservation
- Water Conservation
- Pollution Prevention
- Medical Technology
- Healthy People

Results: The Green Healthcare audit identified numerous areas that need improvement in order to be on the path towards an environmentally sustainable healthcare facility. These improvements include:

- Hospital wide recycling program
- Paper waste minimization
- Red-bag waste minimization
- Green purchasing (replacing styrofoam cups and single use medical devices)
- Electricity management (energy efficient, motion sensor lights
- Pharmaceutical waste management

On Earth Day, April 22, 2009, HUP started a commingled recycling program in the cafeteria, Department of Emergency Medicine, and Department of Surgery. The Department of Emergency Medicine also initiated a program to minimize paper waste by emailing messages to individuals who waste paper at the printer. A red-bag waste minimization project has also been initiated, in which the current red-bag waste performance is audited and educational materials are provided to initiate improvements throughout the hospital where they are needed.

Discussion: A total score of 31% on the Green Healthcare Audit is probably on par or better than numerous hospitals throughout the U.S., but demonstrates the need for improvement to constitute having ecological sustainable healthcare as a priority. Currently there is a significant lack of standardized knowledge throughout healthcare settings about the numerous facets of ecologically sustainable healthcare. Creating a positive impact on an institution's greenness can be a realistic short-term goal by using proper environmental assessments and interventions. Individuals are ready and eager for structured change and the implementation of innovative environmentally sustainable

practices. Creating comprehensive change in a major institution requires top-down, bottom-up, and from-the-middle approaches; yet, everything begins with individuals.

Conclusion: HUP's Department of Emergency Medicine has initiated procedures to function more sustainably, both economically and environmentally. These new procedures have the potential to enhance quality and efficiency of healthcare, while creating a healthier indoor and outdoor environment. However, monitoring and data collection are needed to assess progress and to suggest future improvements. Through these enhancements, HUP has an opportunity to become a leader in Ecological Sustainable Healthcare. This project utilized a healthcare audit system that was originally adapted from a green office building template. Although the results did yield ample ideas for improvement, future work is needed to create a green healthcare audit that is properly adapted to a major teaching and research-oriented hospital.

Figure 1: Teleosis Leadership in Green Healthcare Icon

INTRODUCTION:

Although the United States spends over $2 trillion annually on healthcare, more than any nation per capita, it is ranked among the lowest of industrialized nations for health indicators such as life expectancy and the rate of infant mortality. This leaves the United States as a whole, with an opportunity. By incorporating a strong conscious effort to green healthcare as a nation, we can produce the tremendous health benefits for both the public and the environment, thus improving overall health and eliminating national health disparities. (Boat, 2008)

With issues such as 24/7 operations, emergency demands, infection control requirements, chemical usage, hazardous waste production, intense energy and water consumption, and general operation standards that put stress and strain on facilities and the employees, healthcare has many obstacles to the implementation of green sustainable protocols. These green sustainable protocols must uphold the fundamental mission of healthcare facilities and professionals to enhance and protect individual and community health, and support a healthy relationship between the constructed, manipulated setting and the natural, ecological environment. Healthcare facilities can be designed and operated in a manner to bring the healing ability of nature to the patient and to harness efficiency to create a high performance healing atmosphere. (GGHCSC, 2007)

A basic tenet of medicine, stated by Hippocrates, is to *first do no harm*. However, many practices within a healthcare setting can be detrimental to the internal and external environment (directly and indirectly) and thus, hazardous to the patients and community

being cared for. In a hospital, money, space, resources, and time, are always in high demand. There is a priority to manage these in a way that maintains quality healthcare, while sustaining a healthy environment for the community to live. By implementing practices such as green purchasing, waste segregation and minimization, and green healthcare education, a hospital can maximize quality care, efficiency, and cost-effectiveness, while sustaining a healthy ecosystem to live in.

Healthcare providers and the public alike have realized the connections between the tremendous effect human actions have on the environment and the reciprocating effect the environment has on human health. Throughout the small and large business divisions, the fields of engineering and architecture, and the residential and personal sectors, people are quickly recognizing that green, environmentally sustainable practices are essential to protect the health of the environment and everything living within it. However, the hospital emergency department is resistant to environmentally sustainable changes because of its physically demanding, naturally critical and resource intensive pace. On the other hand, simple, sustainable changes in this department and throughout the hospital have the potential to produce enormous health benefits for employees, patients, and the greater community.

Therefore, the Hospital of the University of Pennsylvania (HUP) has an opportunity to enhance quality and efficiency of the institution and the healthcare it provides, through incorporating ecological sustainable practices. By focusing on the practices of all employees of the HUP Department of Emergency Medicine, changes in the actions of individuals will then improve the health of the internal and external environment and the people who live and act within it. The HUP Department of

Emergency Medicine has the potential to run its facility in a more sustainable manner, both economically and environmentally. This could enhance patient and employee health, while creating a healthy indoor and outdoor environment. A clean, healthy environment leads to happy patients and employees and creates a healing atmosphere. By becoming environmental stewards, HUP Department of Emergency Medicine will be a role model for the community, the rest of the University of Pennsylvania Health System, and health care facilities around the U.S. and the world.

BACKGROUND AND SIGNIFICANCE:

Health care is "the prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical and allied health professions" (AHD, 2006).

Sustainability refers to a way of living that also allows others to live well, both now and in the future. (Kreisberg, 2008)

Earth's environment is greatly threatened by the impact of human activity including the increasing demands for food, fresh water, fuel, minerals and timber, increasing production of waste, increasing air, soil, and water pollution and an overall lack of effort to replenish these depleted resources or to clean the environment. In turn, the degradation of our environment is a threat to the health and wellbeing of all humans. The resources available to be extracted and the land available on which to deposit waste are both limited. Both the rate at which humans are reproducing and the rate of which natural resources, which are slow to regenerate, are consumed are not in balance. Global environmental change is rapidly increasing which threatens the existence of many of Earth's inhabitants. There is only one Earth. (Horton, 2007; Rosenblatt, 2005)

As the Information Age evolves, interdisciplinary networks create new information databases that are analyzed and evaluated, thus leading to deeper understandings of relationships and realizations that were not clear before. The study of the link between human health and the environment has been evolving ever since humans first stepped on the earth; however, recent links among the fields of healthcare, public health, environmental health, and human health are drastically changing the way healthcare is viewed and performed today and in the future. (Liaskos, 2008; Litt, 2007)

Our knowledge and awareness of the environment's impact on human health has dramatically increased over the most recent decades. Most of the interest in the close relationship between environmental and human health has focused on the macro-environment, which includes water, air and soil pollution, and global warming and climate change; however, there is a growing interest about this relationship within the micro-environment: our workplace, home, and school. The link between human health and the air we breathe or the water we drink is much more commonly recognized than the impact on our health due to our built environment, the everyday products we use, consume and dispose of, the cleaners we use on our clothes and floors and in our kitchens and bathrooms, and the health and personal care and beauty products we put on our body. These common everyday choices we make may actually be compromising our health and the health of the environment. We need to realize the effects that human behavior has on the entire ecosystem that we live in, both the macro and micro environments. (Sattler, 2007)

Of all places, healthcare facilities should be role models for sustainable practices and healthy environments; however, this is hardly the goal for most healthcare institutions. Physicians, nurses, technicians, administrators, environmental service workers and all other hospital employees can transform our health care institutions into environmentally healthy, sustainable, safe places to heal and enhance health. Examples of practices that hospitals can implement and advocate include environmentally preferable purchasing policies, environmentally conscious waste management strategies, minimization of chemical pollutant exposure, a cradle-to-cradle approach to drugs, supply of healthy foods, and leadership in green healthcare and sustainable medicine

stewardship. Sustainable healthcare designs strategies can be implemented to conserve water and energy, create healthy buildings and green space, promote the use of non-hazardous, healthy materials, and improve indoor air quality. Through the one-by-one consideration and implementation of each of these and other practices, we can transform the healthcare setting into a more ideal healing environment for the patients, employees, and the surrounding community of today and tomorrow. (Guenther, 2007; Sattler, 2007)

Every minute of every day, healthcare providers are working to treat and cure individuals and communities who are suffering, living with and dying from various diseases, disorders, and sicknesses. Since the beginning of human existence, healers have also been improving overall human health and quality of life. Everything that has been accomplished in the field of healthcare could be undermined if attention is not given to the health of the environmental and the relationship between human and environment health. Healthcare cannot proceed in a vacuum, isolated from the depletion of natural resources, accumulation of waste, and pollution of the environment upon which human life depends. (Kreisberg, 2008; Rosenblatt, 2005)

Healthcare providers have been designated by society as *healers*. This privilege also carries great responsibility. Healthcare providers have the ability and opportunity to influence individuals and communities and to promote good health for the environment and everything living within it. Healthcare, as a whole, has the ability to repair some of this harm that humans have given to Earth. Through reconnecting and recommitting to the passion that first convinced healthcare providers to become healers, and then extending this passion to respect the wellbeing and joy we receive from a clean, healthy, natural Earth, health will be delivered and received more broadly and deeply. This health

will be profoundly reflected around the world and throughout the proceeding generations. Healthcare providers previously realized the potential of extending their reach beyond curative care (sickness and injury) to also include preventive care and early detection. Now, it is evident that in order to maintain and improve health and quality of life, they must again expand their understanding of wellbeing to include the indoor and outdoor environment. When healthcare providers realize how *not considering about the amount of waste, pollution, and energy consumption that their current healthcare practices require* actually undermines their efforts to heal by hurting the environment in which humans rely on to live, they can begin to adjust and redesign their practices to improve quality of life both directly and through maintaining a healthy environment. By increasing awareness of both the connectedness of all living organisms and the environment, and the effect of the environment on human health, healthcare providers can utilize their ability as healers to restore vitality to Earth. Green healthcare allows healthcare providers to promote health for individuals, communities, and the environment. (Kreisberg, 2008; Rosenblatt, 2005)

There are numerous steps that healthcare providers and institutions can take to enhance human health by minimizing their damage to the environment. Recycling and waste segregation programs can be implemented to minimize incinerated trash, to recycle all recyclable materials, and to properly dispose of all biohazardous waste. By identifying all mercury containing medical equipment and replacing them with non-mercury containing alternatives, the risk of exposure to this neurotoxin can be greatly reduced. Exchanging the current hospital cleaning solutions with alternatives that are more environmentally friendly can also reduce the risk of exposure to other harmful

chemicals. Hospitals can also utilize alternative suppliers for plastics equipment that contain polyvinyl chloride and bis (2-ethylhexyl) phthalate, and materials that contain halogenated fire retardants, thus minimizing the chance these contaminants will leech out and enter the human body. Physicians can spend more time properly diagnosing patients and thus prescribe less unnecessary medications that ultimately end up polluting our environment and persisting in our drinking water (Kreisberg, 2007). Implementing these health care practices will minimize the need to extract resources from the Earth, minimize the amount of trash piling up around the world, drastically reduce exposure to environmental hazards, and thus overall improve the health of Earth and all humans. (Kreisberg, 2008; noharm.org, 2008)

Major categories of green healthcare and sustainable medicine:

- Energy Conservation and Management
- Water Conservation and Management
- Medical Waste Management: Reduction and Segregation
- Pollution Prevention: Internal and External Environment
- Green Purchasing and Medical Technology
- Green Pharmaceutical Practices
- Green Buildings: Construction and Management
- Green Space and Healing Environment
- Food Purchasing and Cafeteria Management

Mercury: One of the first issues that healthcare facilities are tackling in order to improve their environment is the minimization of mercury exposure. The chemical element mercury is a heavy metal and is extremely toxic. Contamination by physical contact, ingestion, or inhalation can cause major problems to the brain, spinal cord, liver, kidney and reproductive system. It is classified as a *persistent bioaccumulative toxicant* and both an environmental and occupational hazard. (Quinn, 2008)

Mercury has long been commonly used for medical purposes in the hospital including Cantor tubes (used to clear intestinal obstructions), esophageal dilators, feeding

tubes, dental amalgam, thermometers, thermostat switches, and sphygmomanometers, as well as in laboratory reagents (fixatives, stains, and others) and vaccines (as a preservative). It can also be found throughout the hospital in non-medical items such as batteries, cleaning solutions, electrical switches, fluorescents and high intensity lamps, nonelectric thermostats and pressure gauges. Some clinicians perceive that mercury equipment produce better measurements with less maintenance than other medical devices; however, for nearly all applications current technological advances have created alternative devices that perform at an equal or higher quality level with little maintenance than the previous mercury instruments. (Simmons, 2003)

Hospitals are the fourth largest source of mercury pollution in the United States, mainly because many reagents are discarded in laboratory sinks, spills are not properly cleaned-up, and broken or leaking equipment is not properly repaired. A mercury spill typically costs the hospital between $7,000 and $9,000 to clean up and can cause the contaminated area to be blocked-off and thus inaccessible for long periods of time. The mercury can possibly contaminate the people that handle it and often eventually ends up in land-fills, local ponds and rivers, and the municipal water supply. As a bioaccumulative toxicant, the mercury is taken-up by microorganisms, plants and small animals, which are eaten by larger animals and again eventually are consumed by humans. Along the whole chain, mercury causes negative physical effects to the organisms. (Simmons, 2003)

Many healthcare organizations have already eliminated mercury from their facilities and numerous others have devised a plan to minimize any possible risk of contamination. As of September 2003, over 1,096 healthcare clinics, 526 hospitals, 46

nursing homes, and 195 other facilities had joined forces with the organization Hospitals for a Healthy Environment and had pledged to eliminate mercury from their facility. The first step to minimize the amount of mercury in a hospital is to search the entire facility to identify and inventory all mercury containing items. Next a facility can determine less hazardous alternative equipment and devise a plan to phase out and properly dispose of the mercury containing equipment. Alongside the product switch, the material manager can make a decision to institute a mercury-free purchasing policy. Finally, after the replacement program has been implemented throughout the facility, it can establish community programs to exchange mercury containing medical devices and to educate families, schools, and other facilities to minimize mercury exposure. (Quinn, 2008)

Dioxins, DEHP & PVC: Polyvinyl-chloride (PVC) is the most widely used plastic in the hospital because of its very useful characteristics such as flexibility, strength, and transparency. PVC is a thermoplastic polymer, which means it is a large string of individual molecules of vinyl-chloride that are able to melt to a liquid state when heated and then mold to a solid state when cooled. Despite its environmental and public health harms, it is still widely used because it is cheap, abundant, and can be used in numerous applications. PVC can be both brittle (vinyl records, vinyl siding, electrical conduit), as well as soft and flexible when plasticizers are added (tubing, hoses, clothing, cable insulation). It is also a component in some cosmetics, toys, wallpaper, water bottles and many other consumer products. In hospitals and other healthcare facilities, it is usually found abundantly in both forms for construction/design materials as well as in various components of medical equipment. The most common plasticizers used with PVC are called phthalates, of which the most common is di(2-ethylhexyl)phthalate (DEHP).

Patients undergoing medical procedures such as a blood transfusion, cardiopulmonary bypass, extracorporeal membrane oxygenation, haemodialysis, intravenous therapy, or nutritional support are exposed to DEHP if the most common equipment is used. Studies have shown that detectable amounts of DEHP leach from the PVC material (IV bags, tubing, etc.) into the blood, intravenous solutions, intravenous fat emulsions, and other solutions that are then used for each patient. It is also possible for the phthalates to leach from the PVC material into the environment and then transfer onto other materials or into the atmosphere. (Takatori, 2007)

DHEP and other phthalates, classified as hormone-disrupting substances, are known to be toxicants to the reproductive and developmental systems, as well as the liver, kidney, and lungs. They are age-, dose-, and time-dependent for each tissue and organ they affect. Exposure to phthalates in pregnant women is known to be significantly associated with the length of pregnancy and the reproductive developmental health of specifically male infants (Latini, 2003; Swan, 2005; Marsee, 2006). In other words, phthalates are toxic to the sexual organs of male fetuses, neonates, infants, and prepubescent males (Takatori, 2007). A major issue with PVC and phthalate products is the fact that they are currently abundant in nearly every part of our life. Little by little their components leak from the products and accumulate in our body, the water supply, and the rest of the environment. In the healthcare setting, they are given a direct route into our body through nearly every tube that provides the necessary blood, nutrients and liquids. It is clearly necessary for healthcare facilities to devise specific goals to minimize the amount of PVC and phthalate exposure to patients and find alternatives for their current PVC products. Special care should be taken when dealing with the high risk

populations of pregnant women and their male babies. Alternative plasticizers used with PVC, such as di(2-ethylhexyl)adipate (DEHA) and tri(2-ethylhexyl)trimellitate (TOTM), have been shown in research studies to have much less leach-ability and be less toxic than DEHP. Also numerous companies have developed PVC-free alternatives for medical equipment, construction materials, and consumer products. (Hansen, 2006; Takatori, 2007)

Dioxins are a group of very toxic by-products from the production and incineration of PVC and other solid waste, including medical waste. During production and incineration, dioxins are released into the air and spread throughout the environment. Hospitals are the third major polluter of dioxins in the United States (Quinn, 2006). Dioxins have been found, however, in soil and water samples from all over the world and are known to bioaccumulate up the food chain. They are stored in the fatty tissue of animals and then are consumed by humans, most commonly by eating beef, fish, and dairy products. Babies are at the top of this food chain and attain 10% of their lifetime dioxin exposure from their mother's fatty breast milk (Sattler, 2005). Epidemiological research, majority of which are occupational health studies, has found dioxin exposure to be associated with human cancers of the hematopoietic system, liver, lungs, and thyroid gland, as well as connective and soft tissue sarcoma (Bertazzi, 1993; Fingerhut, 1991; Flesch-Janys, 1995; Huff, 1994; Manz, 1991; Thornton, 1996; Zober, 1990; Zober, 1994). They are also classified as an endocrine disrupter because of the disturbance caused to the normal activity of specific hormones, including testosterone and thyroid hormone. Overall, the production, application and destruction processes of PVC and phthalates need to be carefully re-evaluated and the use of these products needs to be

minimized. More research is needed to determine healthy and environmentally-friendly alternative materials are for each application. (Sattler, 2005)

BFRs: Flame retardants are found all over the healthcare setting (as well as in the home and office) in such items as IV pumps, curtains, refrigerators, ventilators, monitors, waiting and patient room furniture, window blinds, computers, televisions, hospital beds, packaging foam, etc. Flame retardants can be found in basically every room of the hospital, from the morgue to the birthing center, because federal fire safety regulations require that manufactures add them to most products. Many of these fire retardants leak out of these products into the water and air, and often bind to dust particles. Roughly one-fourth of these contains bromine and thus fits into the category called the brominated flame retardants (BFRs) (Darnerud, 2008). The most common, large volume BFRs include polybrominated diphenyl ethers (PBDE), tetrabromobisphenol A (TBBPA) and hexabromocyclododecane (HBCD). Because of the chemical structure of brominated flame retardants, they persistent in our body and the environment, and also bioaccumulate up the food chain. Patient and occupational exposure can occur from inhalation or ingestion of BFR-contaminated dust particles, or through consumption of food that contains BFRs. Like many other bioaccumulable compounds, a major mode of exposure is from an infant's consumption of breast milk. Recent studies have shown that BFR concentrations in breast milk have increased from less than 1 µg/L to greater than 200 µg/L in the previous 25 year period (Juhasz, 2007). Breast milk of American women has been shown to contain the highest levels of BFRs than anywhere else in the world and thus nursing infants could be receiving over 300 ng/kg of BFRs a day. This makes

newborns and toddlers at the highest risk for BFR exposure and the negative health effects that follow. (Darnerud, 2008; Juhasz, 2007)

Brominated fire retardants are endocrine disrupters that affect the function of thyroid hormones and sex hormones, including estrogen and androgen. It is also believed that BFRs are a developmental neurotoxin, cause morphological changes to the kidney and liver, affect puberty onset, cause immune suppression, and impair spermatogenesis. Long term studies are needed to fully understand the health and environmental effects of BFRs, but it is certain that the increasing concentrations of BFRs in both the environment and the body from the abundant supply of products that surround us, is not beneficial to our health. Many companies are now using alternative materials as a fire retardant that have been researched and shown to be less harmful. Healthcare systems can use their mass purchasing power to force companies to fully disclose all fire retardants and other possible toxic ingredients that are a part of their product and thus only purchase products that meet green standards. (Darnerud, 2008; HCWH, 2007; Juhasz, 2007)

Medical Waste: Hospitals produce more than two million tons of waste each year. According to *Hospitals for a Healthy Environment*, "Institutions that have reduced the volume of regulated waste save 40% to 70% on waste disposal" (Hampton, 2007). Most hospitals do not make an effort to understand how much excess waste they generate or the cost of that waste, both financially and environmentally. From the surgical room to the birthing center, the cafeteria to housekeeping, waste quickly accumulates and until recently, most hospitals simply disposed of all types of waste together and either burned it in an incinerator or dumped it in a landfill. Now, healthcare facilities understand that incinerators are a major producer of highly toxic air pollutants such as acidic gasses,

dioxins, furans, lead, mercury, particulate matter, and others. Healthcare facilities have a responsibility to manage their waste in a manner that protects the health of the environment and the public. Green medical waste management includes the three R's—reduce, reuse, recycle—as well as multiple levels of proper hazardous waste disposal. With effective education of healthcare providers and other hospital workers, many items can be reused or recycled with no risk of contamination. Items that can be recycled include paper, plastic, glass, fluorescent light bulbs, batteries, chemicals, and food. There are proper established procedures to recycle chemicals such as alcohol, formalin, and xylene, and keep them from polluting the environment. Hospitals that purchase reusable and recyclable products when possible and that go paperless by implementing electronic medical records will greatly benefit by saving time, money and their local ecosystem. With better organization of medical equipment, safe sterilization and reuse procedures, and proper regulated disposal for items that cannot be reused, both purchasing and disposal costs can greatly be decreased. By segregating different types of waste from the time of generation and then keeping them isolated, the proper recovery, recycle, or disposal process can be implemented for each material. Infectious and other hazardous waste, including radioactive waste, can also now be disposed of in a much easier and efficient way, thus enhancing health safety. By setting a goal to minimize the dangerous practice of incineration and the expansion of landfills, healthcare facilities can provide tremendous health benefits to the public and the environment. Without a doubt, there are clear simple ways that every hospital can provide superior healthcare and a healthier environment through green resource and waste management. (Hampton, 2007) (HCWH, 2007)

Healthy Building: Over 3 billion tons of raw materials annually (40% energy resources, 75% of PVC, 40% of raw stone, gravel, sand, and steel, 25% of virgin wood, and 17% of freshwater flows) are associated with the construction and use of buildings in the United States. These same buildings generate 25-40% of municipal solid waste from construction and demolition alone, 30% of CO2 production, 50% of CFCs, and large quantities of other toxic emissions. (GGHCSC, 2007) From the design to construction, maintenance to renovation, there are numerous ways that a healthcare facility itself can provide green health benefits. A green building design can maximize patient comfort and employee productivity, while also minimizing the amount of energy needed to keep the hospital functioning. By utilizing large, energy efficient glass windows throughout the building, free natural light can replace much of the energy needed for daytime lighting. Compact fluorescent bulbs further reduce the need for energy and thus the overall cost of day and night time lighting. A well designed, centralized, airflow system can utilize both natural air from fully opening security windows and vents and a highly energy efficient heating and cooling system to provide fresh clean air. Proper air circulation can make a major difference in the patient's ability to heal and can enhance the productivity of employees. Furniture and counters with specialized surfaces can significantly decrease dust and dirt buildup, thus minimizing the amount of time and chemicals needed for cleaning. Using fewer cleaning solutions reduces the amount of cross-contamination and the risk of hazardous chemical accidents. (Eaton, 2006; Hampton, 2007)

During the construction of the hospital building, material selection and again, resource and waste management, are at the forefront of every green engineer's mind. Much of the material can be purchased at a lower cost locally from building material

recycling sites or through nearby manufacturing facilities. By incorporating materials that can be recycled at the end of the building's life, such as stone, terracotta blocks, and aluminum panels, there are additional financial and environmental benefits. Completing the building with an array of solar panels and wind turbines will provide the finishing touch of environmental friendly energy to power the hospital. (Eaton, 2006)

Conclusion: There are numerous other ways that healthcare facilities can choose to go green and thus provide a healthier environment for the public and healthier people to enjoy the environment. Healthcare facilities as a whole can use their enormous purchasing power to demand products that were designed, manufactured, and delivered utilizing green practices. Hospitals can choose to purchase and provide healthy healing foods in the cafeteria that are either locally grown or have used minimal transportation. They can also insist that the food be grown, harvested and shipped in an environmentally friendly manner. Healthcare facilities can demand that all of their electronic equipment, such as computers, MRIs, and surgical robots, be made with minimal hazardous components and that the companies provide proper disposal and recycling programs for old equipment. With good intentions in mind to keep the hospital clean, hospitals often use excess amounts of harsh cleaners, disinfectants, and pesticides. By reviewing cleaning chemicals, protocols, and equipment, healthcare facilities can provide a cleaner, healthier environment with fewer harsh chemicals. Environmental, occupational, and patient hazards often come from the same sources and thus there is a marvelous opportunity for healthcare facilities to utilize green healthcare ideas to produce major health benefits. In a hospital, money, space, resources, and time are always in high demand. How to manage these resources in a way that increases the quality of healthcare

provided to each individual patient and that sustains a healthy environment for the community to live is of utmost concern. (HCWH, 2007)

SPECIFIC AIMS:

1. To enhance my understanding of sustainable healthcare and its implementation in the hospital setting by taking the 8 week online Green Healthcare Leadership Course offered by the Teleosis Institute

2. To form a Green Team of all interested employees in order to successfully accomplish the following goals:

a) To complete a Green Healthcare Audit of the Hospital of the University of Pennsylvania

b) To communicate with Emergency Department employees about the current practices and resource uses of the department and about its future needs

c) To provide green healthcare and sustainable medicine education to department employees

d) To implement green healthcare and sustainable medicine practices and create a sustainable and economically feasible action plan for the future

DESIGN AND METHODS:

THERE WERE NO RESEARCH SUBJECTS ENROLLED IN THIS STUDY

Overview of Study Design: The principal goal of this study was to increase and enhance sustainable healthcare practices at the University of Pennsylvania Department of Emergency Medicine. To do this, a Green Team, including employees from various departments, was formed in order to create a widespread effort throughout the hospital. A Green Healthcare audit (including the topics of solid waste reduction & recycling, energy conservation, water conservation, pollution prevention, medical technology, and healthy people) was conducted throughout the hospital and the information gained was utilized to guide the Green Team in their efforts to make effective changes. The Green Team also

facilitated communication among departments about changes in current practices, the implementation of new procedures, and about future needs to become environmentally sustainable. The Green Team's efforts ensured that appropriate measures were taken to proceed smoothly. The Green Team organized its efforts and distributed tasks through weekly meetings. Separate meetings and hospital rounds allowed time to discuss with hospital employees about new ideas, to educate about new practices, and to receive feedback on previously implemented green practices.

Extra time was spent observing throughout the Department of Emergency Medicine in order to gain a better understanding of the daily practices, materials consumption, and waste production. Individual meetings were held with the directors of Environmental Services, Physical Plant, Building Engineering and Facilities, Product Purchasing, Emergency Medicine, Executive Board, and other hospital departments in order to achieve support in a well-rounded approach. In order to acquire professional guidance in the field of sustainable healthcare, I enrolled in and completed the Green Healthcare Leadership course offered through the Teleosis Institute. The course was an 8-week online course directed to educate healthcare providers (physicians, nurses, dentists, chiropractors, etc.) about ecologically sustainable healthcare practices. Contact was maintained with the director of the Teleosis Institute and other national green sustainable healthcare organizations, as well as with individual members of other hospital green teams around the U.S. Throughout the year, I also encourage the Hospital of the University of Pennsylvania to become a member of the organization *Practice Greenhealth*, "the nation's leading membership and networking organization for institutions in the healthcare community that have made a commitment to sustainable,

eco-friendly practices [including] hospitals, healthcare systems, businesses and other stakeholders engaged in the greening of healthcare to improve the health of patients, staff and the environment" (PG, 2008). By the end of the project, a sustainable and economically feasible action plan was developed for the HUP Department of Emergency Medicine to maintain its Green Team, to proceed with plans to become more economically and environmentally sustainable, and to promote the HUP Department of Emergency Medicine as a Green Healthcare leader and role model for the community, other healthcare institutions, and the U.S. health care system. To present the results of this project on an international level and to tremendously enhance my knowledge of the field of ecologically sustainable healthcare, I presented my project in the form of a poster at the 2009 International CleanMed Conference in Chicago, IL, on May 20th, 2009. The informational gained from this event was also presented to the HUP Department of Emergency Medicine and the Green Team.

RESULTS:

I successfully completed the Teleosis Institute Green Healthcare Leadership Course in November 2008. From this course, the Green Healthcare Audit forms, which were used in this project, were obtained. Throughout the year one-on-one meetings were held with various HUP support directors (including Environmental Services, Physical Plant, Building Engineering and Facilities, Product Purchasing, Safety Management, Emergency Medicine, Executive Board, and other hospital departments) in which they completed their respective portion of the audit forms and I provided them with specific information on how to green their department. The results of the audit revealed

numerous areas that need improvement in order to be on the path towards an environmentally sustainable healthcare facility. These suggested improvements include:

- Hospital wide recycling program
- Paper waste minimization
- Red-bag waste minimization
- Green purchasing (replacing styrofoam cups and single use medical equipment)
- Electricity management (installing energy efficient, motion sensors lights)
- Pharmaceutical waste management

Audit forms (Teleosis, 2006) -*see appendix*

- Solid Waste Reduction & Recycling
- Energy Conservation
- Water Conservation
- Pollution Prevention
- Medical Technology
- Healthy People

TELEOSIS

OVERALL SCORE

SECTION	TOTAL of Your Possible Points	TOTAL of Your Score	OVERALL Score
SOLID WASTE REDUCTION & RECYCLING	102	26	
ENERGY CONSERVATION	70	16	
WATER CONSERVATION	46	12	
POLLUTION PREVENTION	86	36	
HEALTHY PEOPLE	72	24	
MEDICAL TECHNOLOGY	157	47	
GRAND TOTAL	533	163	31%

Overall Score is: 31 %

0-59% NEEDS IMPROVEMENT
60-74% GHC BRONZE STAR
75-89% GHC SILVER STAR
90-100% GHC GOLD STAR

GREEN HEALTH CARE PROGRAM – GREEN OFFICE CHECKLIST
Version 11.1.07
www.teleosis.org

Figure 2: Overall Green Healthcare Audit results from HUP

On Earth Day, April 22, 2009, HUP started a commingled recycling program in the cafeteria, Department of Emergency Medicine, and Department of Surgery. The Department of Emergency Medicine also initiated a program to minimize paper waste by emailing messages to individuals who waste paper at the printer. A red-bag waste minimization project has also been initiated, in which the current red-bag waste performance is audited and educational materials are provided to initiate improvements throughout the hospital where they are needed.

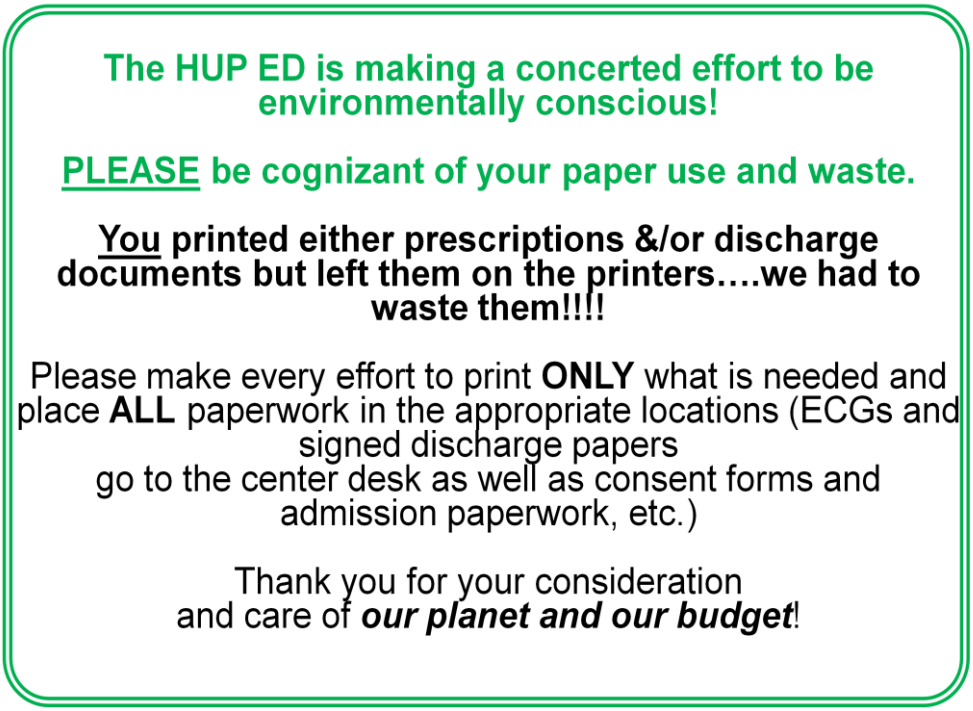

Figure 3: Paper waste message emailed to each individual whose wasted paper is found at the printer in the HUP Department of Emergency Medicine

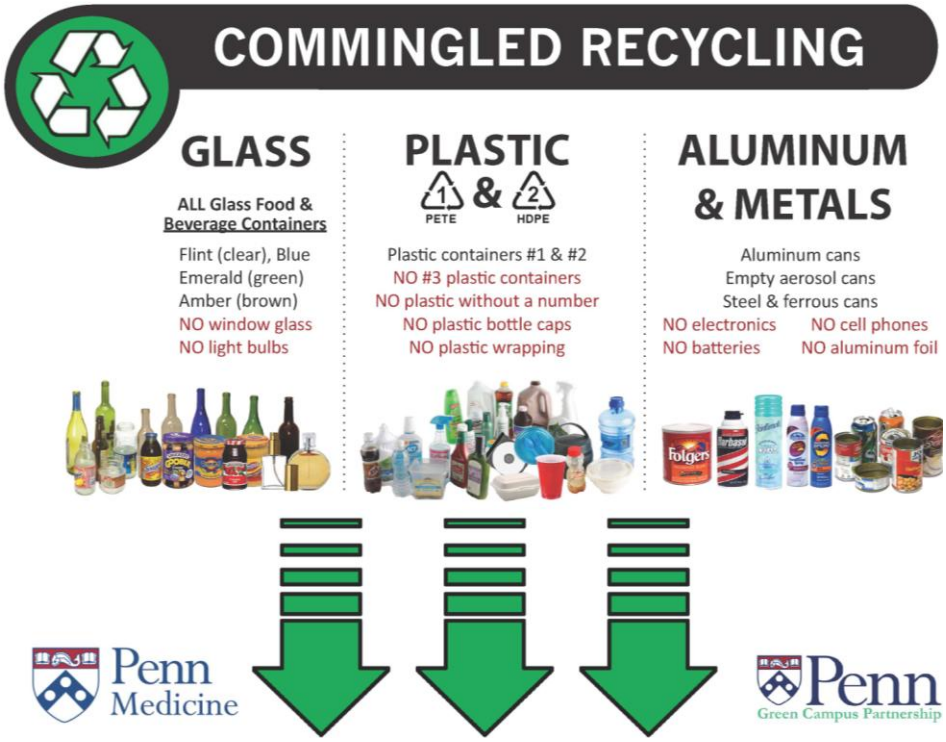

Figure 4: Penn Medicine recycling poster which is displayed above every recycling bin

Figure 5: Photos from the HUP Earth Day Recycling event (May 22, 2009)

DISCUSSION:

A total score of 31% on the Green Healthcare Audit is probably on par with or better than numerous hospitals throughout the U.S., but demonstrates the need for improvement to constitute having ecological sustainable healthcare as a priority. The audit forms were adopted from a green office building audit for health clinics by the Teleosis Institute, and then applied to a major research and academic hospital for this project. Currently there have been no other large hospitals that have used these audit forms and thus no other hospitals to compare results against. Two possible routes of future green healthcare audits for HUP include using the Green Guide to Health Care or Practice Green Health. The Practice Green Health Audit requires the hospital or healthcare system to purchase a membership to the organization in return for a full service audit, education, and improvement program. The Green Guide to Health Care is a free, highly developed, step-by-step guide for the hospital sustainability director to use in both the construction and operation of a hospital.

Currently there is a significant lack of standardized knowledge throughout healthcare settings about the numerous facets of ecologically sustainable healthcare. There are numerous domestic and international organizations, as well as an annual international conference, which are all devoted to the field of green healthcare; yet, the healthcare sector has been slow to comprehensively adopt ecologically sustainable healthcare standards. A positive impact on an institution's greenness can be a realistic short-term goal by using proper environmental assessments and interventions. Individuals are ready and eager for structured change and the implementation of innovative environmentally sustainable practices. Creating comprehensive change in a

major institution requires the top-down, bottom-up, from-the-middle approach; yet, everything begins with individuals.

CONCLUSION:

HUP's Department of Emergency Medicine has initiated procedures to function more sustainably, both economically and environmentally. These new procedures have the potential to enhance quality and efficiency of healthcare, while creating a healthier indoor and outdoor environment. However, monitoring and data collection are needed to assess progress and to suggest future improvements. Through these enhancements, HUP has an opportunity to become a leader in Ecological Sustainable Healthcare. This project utilized a healthcare audit system that was originally adapted from a green office building template. Although the results did yield ample ideas for improvement, future work is needed to improve the green healthcare audit in order for it to be properly adapted to major teaching and research-oriented hospitals.

Figure 6: (Apollo, 1968): Earthrise at Christmas

LIST OF REFERENCES

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AHD. (2006). health care. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Retrieved 20 November 2008 from Dictionary.com website:http://dictionary.reference.com/browse/health care

Apollo 8 NASA Crew. (1968). Earthrise at Christmas. [Photograph]. NASA Images. Retrieved 20 Nov. 2008 from http://www.nasa.gov/images/content/54428main_MM_image_feature_102_jwlarge.jpg

Bertazzi, PA. et. al. (1993). Cancer incidence in a population accidentally exposed to 2,3,7,8-tetrachlorodibenzo-para-dioxin. *Epidemiology*. 4. 398-406

Boat, T., *et. al*. (2008, February 6). From Waste to Value in Health Care. *Journal of the American Medical Association*. 299. 5. 568-571

Eaton, L. (2006). Green Buildings. *BMJ*. 332. 1389-1390

Fingerhut, MA. et. al. (1991). Cancer mortality in workers exposed to 2,3,7,8-tetrachlorodibenzo-p-dioxin. *New England Journal of Medicine*. 324. 212-218

Flesch-Janys, D. et. al. (1995). Exposure to polychlorinated dioxins and furans (PCDD/F) and mortality in a cohort of workers from a herbicide-producing plant in Hamburg, Federal Republic of Germany. *American Journal of Epidemiology*. 142. 165-175

GGHC. (2008). the Green Guide to Health Care. Retrieved 12 Nov. 2008 from http://www.gghc.org/

Green Guide to Health Care Steering Committee. (2007, January). Green Guide to Health Care 2.2. *Green Guide to Health Care*. Retrieved February 29, 2008 from http://www.gghc.org/PilotDocsPub//GGHC%20Version%202.2/00-GGHC_v2-2_070430.pdf

Guenther, R. and Hall, A. G. (2007). Healthy Buildings: Impact on Nurses and Nursing Practice. *The Online Journal of Issues in Nursing*. 12. 2. Retrieved 12 October 2008 from http://www.medscape.com/viewarticle/561369

Hampton, T. (2007, October 10). Hospitals and Clinics Go Green for Health of Patients and Environment. *Journal of the American Medical Association*. 298. 14. 1625-1627

Hansen, G., (2006, April). PVC and Phthalates in Medical Devices: A Never Ending Story. *Medical Device Technology*. 17. 3. 16-18

HCWH. (2008). Going Green: A Resource Kit for Pollution Prevention in Health Care. *Health Care Without Harm*. Retrieved 10 Nov. 2008 from http://www.noharm.org/goingGreen

Horton, G. and Magin P. (2007). Healthy patient, healthy planet: Green recommendations for GP health promotion. *Australian Family Physician*. 36. 12. 1006-8

Huff, J. (1994). Dioxins and mammalian carcinogenesis. In: Schecter A, editor. Dioxins and health. New York: Plenum Press. 389-408

Juhasz, A., *et. al*. (2007, December). Brominated flame retardants-safety at what cost? *The Lancet*. 370. 9602. 1813-1814

Kreisberg, J. (2008). Green Medicine: An Integral Approach That Benefits Physicians, Patients, Communities, and the Environment. *Integrative Medicine*. 6. 6. 138-142

Kreisberg, J. (2007). Green Pharmacy: Preventing Pollution. *The Journal of Ecologically Sustainable Medicine*. Spring/Summer. 25-29

Latini, G. et. al. (2003). In utero exposure to di-(2-ethylhexyl)phthalate and duration of human pregnancy. *Environmental Health Perspective.*111. 1783-1785

Litt, J.S. et. al. (2007, Mar). Advancing health and environmental disease tracking: a 5-year follow-up study. *American Journal of Public Health*. 97. 3. 456-63

Liaskos, J. et. al. (2008, Sept.). Promoting interprofessional education in health sector within the European Interprofessional Education Network. *International Journal of Medical Informatics*. Available online 21 September 2008.

Manz, A. et. al. (1991). Cancer mortality among workers in chemical plant contaminated with dioxin. *Lancet*. 338. 959-964

Marsee, K., et. al. (2006). Estimated daily phthalate exposures in a population of mothers of male infants exhibiting reduced anogenital distance. *Environmental Health* Perspective. 114. 805–809

Noharm.org. (2008). Our Issues. Health Care Without Harm. Retrieved 2 December 2008 from http://noharm.org/us

Practice Greenhealth. (2008). Join Practice Greenhealth. Practice Greenhealth. Retrieved 12 Nov. 2008 from http://www.practicegreenhealth.org/

Quinn, M., *et. at*. (2008, March 10). Pollution Prevention – Occupational Safety and Health in Hospitals: Alternatives and Interventions. *Journal of Occupational and Environmental Hygiene*. 3. 4. 192-193

Rosenblatt, R. (2005). Ecological Change and the Future of the Human Species: Can Physicians Make a Difference? *Annals of Family Medicine*. 3. 2. 173-6

Sattler, B., Condon, M. (2005). Nurses-Defenders of Environmental Health, Polyvinyl Chloride (PVC). *The Alabama Nurse*. 32. 3. 12

Sattler, B. and Hall, K. (2007). Healthy Choices: Transforming Our Hospitals into Environmental Healthy and Safe Places. *The Online Journal of Issues in Nursing*. 12. 2. Retrieved 12 October 2008 from http://www.medscape.com/viewarticle/561371

Simmons, J., *et. al*. (2003, October). Making an Impact on the Hospital Environment to Improve Quality Care. *The Quality Letter for Healthcare Leaders*. 2-11

Swan, S.H., et. al. (2005). Decrease in anogenital distance among male infants with prenatal phthalate exposure. *Environmental Health Perspectives*. 113. 1056–1061

Takatori, S., *et. al*. (2007). Simulated neonatal exposure to DEHP and MEHP from PVC enteral nutrition products. *International Journal of Pharmaceutics*. 352. 139-145

Teleosis Institute. (2006). Green Health Care Program – Green Office Checklist. *telesosis.org*.

Thornton, J. et. al. (1996). Hospital and Plastics: Dioxin prevention and medical waste incinerators. *Public Health Reports*. 11. 298-313

Zober, A.et. al. (1990). Thirty-four year mortality follow-up of BASF employees exposed to 2,3,7,8-TCDD after the 1953 accident. *International Archives of Occupational Environmental Health*. 62. 139-157

Zober, A. et. al. (1994). Morbidity follow-up study of BASF employees exposed to 2,3,7,8-tetrachlorodibenzo-p-dioxin after a 1953 chemical reactor incident. *Occupational Environmental Medicine*. 51. 7. 479-4876

APPENDIX

APPENDIX A: Green Healthcare Internet and Organizational Resources

- Health Care Without Harm (HCWH) http://noharm.org/us

HCWH's Green Healthcare Tool-Kit: http://noharm.org/goingGreen

"Health Care Without Harm is an international coalition of hospitals and health care systems, medical professionals, community groups, health-affected constituencies, labor unions, environmental and environmental health organizations and religious groups. Our mission is "to transform the health care sector worldwide, without compromising patient safety or care, so that it is ecologically sustainable and no longer a source of harm to public health and the environment." "We are a global coalition of 473 organizations in more than 50 countries working to protect health by reducing pollution in the health care sector."

- Teleosis Institute: http://www.teleosis.org/index.php

"The Teleosis Institute is devoted to developing effective, sustainable health care provided by professionals who serve as environmental health stewards." "Teleosis is a program of Practice Greenhealth, the nation's leading membership and networking organization for institutions in the healthcare community that have made a commitment to sustainable, eco-friendly practices. Practice Greenhealth members include hospitals, healthcare systems, businesses and other stakeholders engaged in the greening of healthcare to improve the health of patients, staff and the environment." "The Leadership in Green Health Care course is designed to prepare health professionals as leaders in the newly emerging discipline of Sustainable Medicine. Sustainable Medicine is an approach to health and wellness that focuses on cost-effective health care, renewable treatment methods, and preventative self-care education."

- CleanMed: http://www.cleanmed.org/

"CleanMed is the premier environmental conference for leaders in health care. The conference attracts key decision-makers from across the health care supply chain." Their mission is to "Accelerate the health care sector's commitment to environmental sustainability and regenerative health to improve the health of people and the environment."

- U.S. Green Building Council: http://www.usgbc.org/

"The U.S. Green Building Council (USGBC) is a 501 c3 non-profit organization committed to a prosperous and sustainable future for our nation through cost-efficient and energy-saving green buildings." Their mission is "To transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life."

- Practice Green Health: http://www.practicegreenhealth.org/

"Practice Greenhealth is the nation's leading membership and networking organization for institutions in the healthcare community that have made a commitment to sustainable, eco-friendly practices. Members include hospitals, healthcare systems, businesses and other stakeholders engaged in the greening of healthcare to improve the health of patients, staff and the environment."

- Green Guide to Health Care: http://www.gghc.org

"*Green Guide for Health Care*, the healthcare sector's first quantifiable sustainable design toolkit integrating enhanced environmental and health principles and practices into the planning, design, construction, operations and maintenance of their facilities. This *Guide* provides the healthcare sector with a voluntary, self-certifying metric toolkit of best practices that designers, owners, and operators can use to guide and evaluate their progress towards high performance healing environments."

- The Story About Stuff: http://www.storyofstuff.com/

"From its extraction through sale, use and disposal, all the stuff in our lives affects communities at home and abroad, yet most of this is hidden from view. The Story of Stuff is a 20-minute, fast-paced, fact-filled look at the underside of our production and consumption patterns. The Story of Stuff exposes the connections between a huge number of environmental and social issues, and calls us together to create a more sustainable and just world. It'll teach you something, it'll make you laugh, and it just may change the way you look at all the stuff in your life forever."

- Care2 Social Network: http://www.care2.com/

"Largest online community empowering people to lead a healthy and green lifestyle while taking action on important causes such as human rights, animal welfare and global warming."

- Green Your: http://www.greenyour.com/

"While our society is becoming increasingly aware of the environmental impact we have on the planet, we are also increasingly confused and often misinformed about the solutions that exist to minimize this impact. We built GreenYour to make solutions more accessible. When you search for something you want to green, you will see pages on Facts, Tips, and Products. Fact pages aggregate research on the main environmental impact and help answer the question "what's the big deal?" Tip pages provide recommendations and help users take action. Product pages list products and services that have been vetted by our editorial staff and which meet our green criteria."

• GoodGuide: http://www.goodguide.com/
"GoodGuide provides the world's largest and most reliable source of information on the health, environmental, and social impacts of the products in your home."

• Environmental Working Group: http://www.ewg.org/
"The mission of the Environmental Working Group (EWG) is to use the power of public information to protect public health and the environment. EWG is a 501(c)(3) non-profit organization, founded in 1993 by Ken Cook and Richard Wiles…EWG specializes in providing useful resources (like Skin Deep and the Shoppers' Guide to Pesticides in Produce) to consumers while simultaneously pushing for national policy change."

• Skin Deep: http://www.cosmeticsdatabase.com
"Skin Deep pairs ingredients in more than 42,000 products against 50 definitive toxicity and regulatory databases, making it the largest integrated data resource of its kind. Why did a small nonprofit take on such a big project? Because the FDA doesn't require companies to test their own products for safety. Our aim was to fill in where companies and the government leave off: companies are allowed to use almost any ingredient they wish, and our government doesn't require companies to test products for safety before they're sold. EWG's scientists built Skin Deep to be a one-of-a-kind resource, integrating our in-house collection of personal care product ingredient listings with more than 50 toxicity and regulatory databases. Now in its fourth year and third major update, our Skin Deep database provides you with easy-to-navigate safety ratings for nearly a quarter of all products on the market — 42,801 products with 8,381 ingredients. At about one million page views per month, Skin Deep is the world's largest and most popular product safety guide."

• Physicians for Social Responsibility: http://www.psr.org
"Physicians for Social Responsibility is a non-profit advocacy organization that is the medical and public health voice for policies to stop nuclear war and proliferation and to slow, stop and reverse global warming and toxic degradation of the environment. PSR's 32,400 medical and health professionals and concerned citizen members, 31 PSR chapters, over 60 Student PSR chapters at medical and public health schools, and over 25,000 e-activists, along with national and chapter board members and staff, form a unique nationwide network committed to a safe and healthy world."

• Healthy Building Network: http://www.healthybuilding.net/healthcare
"The Healthy Building Network works with the health care industry to enable these institutions, architects, designers, and other specifiers to utilize their buying power to transform the market toward healthier and more just building materials. To that end, we have served as a consultant to Kaiser Permanente (KP) as the health system has undertaken efforts to transform the building materials market. We are one of the leaders in the Global Health and Safety Initiative's built environment work group, working with a coalition of hospital systems, architects and designers, governmental and non-governmental organizations to move toward more environmentally responsible building materials.

APPENDIX A

TELEOSIS

GREEN HEALTH CARE ONLINE CHECKLIST INSTRUCTIONS

The Green Office Checklist has been designed to help you assess the sustainability of your health care office and to assist you in making ongoing improvements. The checklist covers the following areas:

- Solid Waste Reduction & Recycling
- Energy Conservation
- Water Conservation
- Pollution Prevention
- Medical Technology
- Healthy People

Rather than aiming to score "perfectly," we encourage you to emphasize continual improvement and refinement of your practices and knowledge. We also recommend that you approach your "to do" list at a pace that is manageable and sustainable for you.

The "greening" process will look different for every individual or office. For this reason, your overall score in the Green Office Checklist will be determined by the actions you complete out of those that are applicable to your practice. We recommend that the checklist be completed by or with someone who is knowledgeable about the operations of the office and has the ability to influence operating policies and procedures.

Teleosis offers consulting services to advance "greening" efforts in your facility or practice. These include, but are not limited to:

- Green Office Assessment Report
- Action Plan (Long and Short Term)
- Ongoing Consultation for Green Operations Implementation

Teleosis wishes to thank the Bay Area Green Business Program (www.abag.ca.gov/bayarea/enviro/gbus/gb.html) for their permission to incorporate their checklists on Solid Waste, Energy Conservation, Water Conservation and Pollution Prevention into the Green Health Care Program.

CHECKLIST INSTRUCTIONS

In the checklist, read each task and fill out the following columns: A) Does it apply to you? B) Your Possible Points, C) Did you do it?, and D) Your Score.

If the task is applicable to your clinic, and you carried it out: *Write "yes" in column A, and enter in column B the points from the "Possible Points" column. Write "yes" in column C and enter in column D the points from the "Possible Points" column.*

EQUIPMENT CHANGES	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Replace inefficient refrigerators (usually older than ten years) with a new efficient model, such as one labeled Energy Star. (4 pts)	4	Yes	4	Yes	4

If the task is applicable to your clinic and you did NOT carry it out: *Write "yes" in column A, and enter in column B the points from the "Possible Points" column. Write "no" in column C and enter "0" points in column D.*

EQUIPMENT CHANGES	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Replace inefficient refrigerators (usually older than ten years) with a new efficient model, such as one labeled Energy Star. (4 pts)	4	Yes	4	No	0

If the task is not applicable to your clinic: *Write "no" in column A, and enter "0" points in column B. Also enter "no" in column C and "0" points in column D.*

EQUIPMENT CHANGES	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Replace inefficient refrigerators (usually older than ten years) with a new efficient model, such as one labeled Energy Star. (4 pts)	4	No	0	No	0

What if I'm unsure of whether a specific task applies to my office (in column A)?

If you are conducting a self-assessment of your office, use your best judgment in completing the checklist. For example, if you do not have a photocopier in your office, then any tasks pertaining to photocopies do not apply. However, it may be less straightforward, if for example you are renting your office, do have a yard, but do not have any direct control over yard maintenance – do yard maintenance tasks apply? Since the greening process is as much about your efforts as your actions, we encourage you to do what you can to the best of your ability. Contact the property owner, explain to her or him the process you are undertaking, and ask if she or he would be willing to implement some changes.

What if I have carried out a "green" activity or task that is not found on the checklist?

At the end of each section are several blank rows where "Other Activities", not found in the checklist, can be added and counted towards your score.

OTHER ACTIVITIES *Please describe additional activities and assign points. This will be reviewed by GHC Team.*	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**

How do I calculate my score?

At the end of each section, to calculate your ***Section Score****, add up all "Your Possible Points" in column B, and "Your Score" in column D. Divide the "Total of Your Score" by the "Total of Your Possible Points" to find your Section Score percentage.*

	Possible Points	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
TOTAL			**25**		**20**

	TOTAL of Your Possible Points	**TOTAL of Your Score**	**SECTION SCORE**
SOLID WASTE REDUCTION & RECYCLING	25	20	80%

*To calculate your **Overall Score**, after the last section, fill in the "Total of Your Possible Points" and "Total of Your Score" from each section. Divide the "Grand Total of Your Score" by the "Grand Total of Your Possible Points" to find your Overall Score percentage.*

SECTION	TOTAL of Your Possible Points	TOTAL of Your Score	OVERALL Score
SOLID WASTE REDUCTION & RECYCLING	25	20	
ENERGY CONSERVATION	30	25	
WATER CONSERVATION	22	15	
POLLUTION PREVENTION	20	18	
GRAND TOTAL	97	78	80%

0-59% NEEDS IMPROVEMENT
60-74% GHC BRONZE STAR
75-89% GHC SILVER STAR
90-100% GHC GOLD STAR

TELEOSIS

SOLID WASTE REDUCTION & RECYCLING

WASTE ASSESSMENT	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Assess your facility's solid waste management. Identify what materials or wastes are currently generated, approximately how much, and how they are being managed (garbage, recycle, etc.). Look for opportunities to reduce, reuse and recycle.	2	Yes	2	Yes	1
Review the assessment and this checklist annually to identify new ways to reduce waste.	2	Yes	2	No	0
REDUCE PAPER	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Make double-sided printing and copying standard practice in your business. Set the copier and printer default to double-sided.	1	Yes	1	No	0
Use the back sides of printed sheets and outdated letterhead for notes and drafts. Use in the fax and/or the printer.	1	Yes	1	No	0
Eliminate duplicate mailings and subscriptions by sending back mailing labels requesting all but one be removed.	1	Yes	1	No	0
Remove your name or company from junk mail lists by writing to senders requesting removal from their list.	1	Yes	1	No	0
Purge your own mailing lists to eliminate duplication.	1	Yes	1	No	0
Identify and eliminate unnecessary forms, double-side or redesign forms to use less space, or have forms on electronic media.	1	Yes	1	No	0
Eliminate fax cover sheets by using "sticky" fax notes.	1	Yes	1	No	0

Order supplies by e-mail or phone.	1	Yes	1	Yes	1
Send office memos and message via voice- or e-mail, or post at a central bulletin board.	1	Yes	1	Yes	1
Eliminate unnecessary reports and/or reduce report size or frequency.	1	Yes	1	No	0
Use software that allows you to fax directly from your computer, without printing.	1	Yes	1	No	0
Use continuous-circulation envelops within your business. Open mail carefully and reuse incoming envelopes for mail or interoffice circulation.	1	Yes	1	Yes	1
Circulate reports, memos, and periodicals rather than making/receiving individual copies.	1	Yes	1	Yes	1
Use "central" hard copy files, instead of multiple personal files.	1	Yes	1	Yes	1
For new software, order only the number of manuals needed. Do the same with phone books. Encourage employees to share.	1	Yes	1	No	0
REDUCE OTHER WASTE	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Switch to bulk-dispensed soap and other amenities in restrooms.	1	Yes	1	Yes	1
Select products with the least packaging and/or which have easily recyclable packaging.	1	Yes	1	No	0
Work with vendors to minimize product packaging. Ask vendors to take back packaging and used or damaged products for reuse and recycling. Choose vendors that offer these services.	3	Yes	3	Yes	1
Specify deliveries in reusable or returnable containers.	2	Yes	2	No	0
Purchase reusable rather than disposable office items, such as refillable pens, erasable white boards and wall calendars.	1	Yes	1	No	0
In the lunch or break room, eliminate disposables by using permanent ware (mugs, dishes, utensils, towels, etc.) and using refillable condiment containers (for milk, sugar, salt, etc.) to avoid individual packets.	2	Yes	2	No	0
Buy products bulk, concentrated, durable, repairable, and/or recyclable, making sure that you need all you are ordering.	1	Yes	1	Yes	1
Centralize purchasing to eliminate unnecessary purchases and ensure that all waste reduction purchasing policies are followed.	2	Yes	2	Yes	1
Track material usage to optimize ordering and use of time-sensitive materials.	1	Yes	1	Yes	1
Maintain proper storage conditions to keep materials in good condition (avoid extreme temperature, humidity, etc.). Arrange storage area and access to reduce potential for damaging	1	Yes	1	No	0

stock.					
For catered events ask to serve "family-style" in reusable serving dishes.	2	Yes	2	Yes	1
RECYCLE	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Office paper – computer, copy, letterhead	1	Yes	1	Yes	1
Mixed paper – color, glossy, junk mail, telephone directories, magazines	1	Yes	1	Yes	1
Newspaper	1	Yes	1	Yes	1
Beverage containers and cans	1	Yes	1	Yes	1
Corrugated cardboard	1	Yes	1	Yes	1
Plastics	1	Yes	1	Yes	1
Glass	1	Yes	1	Yes	1
Carpeting	2	Yes	2	No	0
Pallets	2	Yes	2	No	0
Green yard waste – if you use a landscape service, make composting a part of the contract	1	Yes	1	No	0
Food waste	2	Yes	2	No	0
REUSE	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Reuse office packaging (cardboard boxes, bubble wrap, or styrofoam peanuts, etc.) or find someone who can.	1	Yes	1	No	0
Have your customers return packaging to you for reuse.	1	No			
Donate or exchange unwanted but usable items (furniture, electronics, scrap materials, supplies, etc.) to schools, churches, hospitals, libraries, nonprofit and other community organizations.	2	Yes	2	Yes	1
Enroll in a waste exchange program where your "waste" can become another company's "resource".	4	Yes	4	No	0

USE RECYCLED-CONTENT OR USED PRODUCTS	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Letterhead, envelopes or cards	1	Yes	1	No	0
Copy, computer or fax paper	1	Yes	1	No	0
Folders or other paper products	1	Yes	1	No	0
Pencils, rulers or other desk accessories	1	Yes	1	No	0
Toilet paper, tissues or towels	1	Yes	1	No	0
Boxes or bags for retail use or shipping	1	Yes	1	No	0
Dumpster lids, utility bins, drums or recycling containers	1	Yes	1	No	0
Garbage pails or garbage bags	1	Yes	1	No	0
Wood chips, compost and other soil amendments	1	Yes	1	No	0
Carpet, carpet undercushion or floor mats	2	Yes	2	No	0
Desks, shelves or furniture	3	Yes	3	No	0
Construction materials when building or remodeling – building fixtures, ceramic tiles, drywall, insulation, concrete, composite lumber/wood, roofing, flooring, cabinets, ceiling tile, interior paneling	4	Yes	4	No	0
Stock or sell products made with recycled content	2	Yes	2	No	0
IMPLEMENT COMPREHENSIVE PROGRAMS FOR THE SAFE HANDLING OF UNIVERSAL WASTES, INCLUDING:	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Batteries	2	Yes	2	Yes	1
Fluorescent light bulbs	2	Yes	2	Yes	2
Electronics	2	Yes	2	Yes	1
Mercury	3	Yes	3	Yes	3

PVC	3	Yes	3	No	0
Radiologicals	3	Yes	3	No	0
Pharmaceuticals	3	Yes	3	No	0
Sterilants and disinfectants	2	Yes	2	No	0
Laboratory chemicals	2	Yes	2	No	0
Pesticides	2	Yes	2	No	0
OTHER ACTIVITIES *Please describe additional activities and assign points.*	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
TOTAL					

	TOTAL of Your Possible Points	TOTAL of Your Score	SECTION SCORE
SOLID WASTE REDUCTION & RECYCLING	102	27	26%

ENERGY CONSERVATION

ENERGY ASSESSMENT AND HVAC MAINTENANCE	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Have your energy provider conduct a free audit of your facility's energy use to provide you with specific suggestions to conserve energy.	2	Yes	2	No	0
Review the assessment and this checklist annually to identify additional opportunities to improve energy savings.	2	Yes	2	No	0
Conduct monthly energy inspections and offer incentives to employees in return for energy saving practices.	2	Yes	2	No	0
EQUIPMENT	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Use office equipment with energy saving features. When making new purchases, look for computers, copiers, printers, with better Energy Efficient Ratings.	2	Yes	2	Yes	1
Set computer defaults to automatically turn off idle monitors and printers.	1	Yes	1	No	0
Plug office equipment into a time switch to turn off after working hours.	1	Yes	1	No	0
Replace inefficient refrigerators (usually older than ten years) with newer models that have a better Energy Efficient Rating.	4	Yes	4	No	0
Convert electric hot water heaters to natural gas.	4	No	0		
Insulate pipes and hot water heaters.	3	Yes	3	No	0

Use a solar water heater or preheater.	4	Yes	4	No	0
Assess recycling options for end of life electronics to ensure they are disposed of safely.	3	Yes	3	No	0

LIGHTING	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Replace incandescent bulbs with one of the following:					
Halogen PAR lamps	1				
Compact fluorescent bulbs	1	Yes	1	Yes	1
Low voltage track lighting	1				
Increase efficiency of fluorescent fixture in one of the following ways:					
Put in higher efficiency lighting, such as high-pressure sodium or metal halides	2	Yes	2	No	0
Replace magnetic ballasts with electronic ballasts	3				
Install T-8 or T-5 lamps	3				
Reduce the number of lamps and increase lighting efficiency by installing optical reflectors or diffusers	3				
Improve exit sign efficiency by using one of the following:					
LED exit signs	1	Yes	1	No	0
Compact fluorescent bulbs in exit signs	1				
Electroluminescent exit signs	1				
Install lighting controls with one of the following:					
Movement sensors	2	Yes	2	No	0
Bypass or delay timers	1				
Photocells	1				

Time clocks	1				

HEATING/ COOLING UNITS	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Perform regular maintenance on your HVAC (heating, ventilation and air conditioning) system. The HVAC should be regularly cleaned, replacing dirty air filters, and checked for leaks, proper pilot lighting and other problems. If leasing your facility, ask the building owner or manger to do this.	3	Yes	3	Yes	2
Install ceiling fans.	2	Yes	2	No	0
Apply window film to reduce solar heat gain.	2	Yes	2	Yes	0
Shade sun-exposed windows and walls during the cooling season. Use awnings, sunscreens, shade trees or shrubbery.	3	Yes	3	Yes	0
Replace or supplement an A/C system with an evaporative cooler.	2	Yes	2	No	1
Install economizers on A/C to increase air circulation.	2	Yes	2	No	1
Replace old A/C units with newer models that have a better Energy Efficient Rating.	4	Yes	4	Yes	2
Convert electric heating system to a natural gas system.	4	No			
Install bypass timers or time clocks for the HVAC system.	1	Yes	1	No	0
Replace inefficient or broken windows with double-pane, energy efficient windows.	3	Yes	3	Yes	2
Use weatherizing and caulking to seal windows and doors.	2	Yes	2	Yes	1
Provide shading for HVAC condenser.	1	Yes	1	Yes	1
ENERGY SAVING PRACTICES	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Use task lighting where extra light is needed, rather than lighting an entire area.	1	Yes	1	No	0
Rearrange workspaces to take advantage of areas with natural sunlight, and design for increased natural lighting when remodeling.	2	Yes	2	No	0
Always turn off lights when leaving and post reminders.	1	Yes	1	No	0

Dust diffusers annually for optimum light output.	1	Yes	1	No	0
Set thermostat at 68° for heating and 78° for cooling. Use timing devices to turn system down after hours.	1	Yes	1	Yes	1
Set refrigerator temperature between 38° and 42° and freezer between 0° and 5°.	1	Yes	1	Yes	1
Use small fans and space heaters during off hours instead of heating the entire office.	1	Yes	1	No	0
Close blinds and curtains (to reflect sunlight) or use ceiling fans to reduce A/C load.	1	Yes	1	Yes	1
Seal off unused areas of the building. Block and insulate unneeded windows and other openings.	2	Yes	2	No	0
When repainting building exterior and roofs, choose light colors to reflect more sunlight.	1	Yes	1	No	0
Institute a formal policy to turn off equipment and lights when not in use.	1	Yes	1	No	0
Maintain equipment optimum efficiency.	1	Yes	1	No	0
Use the standby mode on equipment (e.g. energy saver buttons on copiers).	1	Yes	1	Yes	1
OTHER ACTIVITIES *Please describe additional activities and assign points. This will be reviewed by GHC Team.*	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
TOTAL					

	TOTAL of Your Possible Points	TOTAL of Your Score	SECTION SCORE
ENERGY CONSERVATION	70	16	22%

TELEOSIS

WATER CONSERVATION

WATER USE ASSESSMENT	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Have your water company conduct a free water use survey of your facility.	2	Yes	2	No	0
Review the assessment and this checklist annually to identify additional ways to reduce your water use.	2	Yes	2	No	0
SIMPLE MEASURES	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Understand your water bill and review it monthly for indications of leaks, spikes or other problems.	1	Yes	1	Yes	1
Learn how to read your water meter.	1	Yes	1	Yes	1
Locate all water sources in facility and identify and implement water conservation options.	2	Yes	2	No	0
Regularly check for and repair all leaks in your facility. (Toilet leaks can be detected in tank toilets with leak detecting tablets, which may be available from your local water company).	2	Yes	2	No	0
Use dry sweeping, water efficient "spray brooms", or low flow spray nozzles rather than a garden hose to wash down concrete or asphalt surfaces.	1	No	0		
Test irrigation sprinklers 4 times per year to ensure proper operation and coverage.	1	No	0		
Repair all broken or defective sprinkler heads, nozzles, lines and valves.	1	No	0		

Adjust sprinklers for proper coverage, optimizing spacing and avoiding runoff onto paved surfaces.	1	No	0		
Adjust sprinkler times and/or durations according to seasons, and water during non-daylight hours.	1	No	0		
Change window-cleaning schedule from "periodic" to "as required".	1	Yes	1	No	0
LARGER CONSERVATION MEASURES	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Install low flow aerators (1.5 gallons per minute or lower) in all kitchen and bathroom faucets.	3	Yes	3	No	0
Install low flow showerheads (2.5 gallons per minute or lower) in showers. (Your water utility may provide these to you free of charge.)	3	Yes	3	No	0
Replace pre-1992 toilets (more than 1.6 gallons per flush) with more water efficient models.	4	Yes	4	No	0
Replace flush mechanisms in urinals with water efficient diaphragms (1.0 gallon per flush) or install new waterless varieties.	4	Yes	4	No	0
Install self-closing faucets (infrared, spring-loaded, etc.).	3	Yes	3	Yes	1
LANDSCAPING	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Mulch garden beds to help reduce evaporation of water from the soil.	2	Yes	2	Yes	2
Modify your existing irrigation system to include drip irrigation where feasible.	2	Yes	2	Yes	2
Install water efficient shrubs or ground cover in place of turf.	2	Yes	2	Yes	2
Replace ground cover or turf with cobble or stones, brick, or mulch.	2	Yes	2	Yes	2
Install rain shut-off devices as part of irrigation system.	2	No			
Renovate existing landscape using drought tolerant and native plants. Native species are most adapted to an area's climatic conditions.	4	Yes	4	Yes	1
Group plants with similar water requirements together on the same irrigation line, and separate plants with different water requirements on separate irrigation lines.	2	Yes	2	No	0
Install a rainwater catchment system to store water for use during dry periods.	4	Yes	4	No	0

OTHER ACTIVITIES *Please describe additional activities and assign points. This will be reviewed by GHC Team.*	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
TOTAL					

	TOTAL of Your Possible Points	**TOTAL of Your Score**	**SECTION SCORE**
WATER CONSERVATION	46	12	26%

TELEOSIS

POLLUTION PREVENTION

POLLUTION ASSESSMENT	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Assess your facility to identify potential sources of pollutants, and ways to reduce them. Consider the following sources: cleaning products, building maintenance materials, pesticides, fertilizers, toners, parking lot runoff, etc. Look for Material Safety Data Sheets (MSDS) to help assess product safety. Identify harmful products or practices and look for safer alternatives. Record your findings and establish a plan to prevent pollution in these areas.	4	Yes	4	No	0
Review the assessment and this checklist annually to identify additional ways to prevent pollution.	2	Yes	2	No	0
ENVIRONMENTALLY PREFERABLE PURCHASING	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Use or specify in janitorial contracts the use of cleaning products, which are safer for the user, building occupants and the environment. Please give examples:	2	Yes	2	Yes	1
Purchase organically or sustainably grown produce and foods for staff kitchen and events.	2	Yes	2	Yes	1
Buy cleaners, paints, batteries and other supplies in optimally-sized containers for your office to avoid unnecessary packaging, as well as left-over and expired materials.	1	Yes	1	No	0
Buy low-mercury fluorescent lamps.	2	Yes	2	Yes	1
Use unbleached and/or chlorine free paper products (copy paper, paper towels, coffee filters, etc.).	1	Yes	1	Yes	1

Buy recycled/remanufactured toner and ink-jet cartridges for your office copiers and printers.	2	Yes	2	Yes	1
Buy rechargeable batteries and appliances, such as hand-held vacuum cleaners and flashlights.	2	Yes	2	No	0
Use non-toxic, low VOC white out and white board pens, etc.	2	Yes	2	No	0
Replace aerosols with non-aerosol alternatives, such as pump sprays for cleaners and fresheners.	1	Yes	0	No	0
Buy recycled paint and low VOC products when available (paint, paint removal products, etc.).	2	Yes	2	No	0
Have promotional materials printed with soy or other low VOC inks.	3	Yes	0	No	0
Procure environmentally preferable electronic equipment with manufacturer take back requirements.	2	Yes	2	Yes	1
Use other "green" vendors such as certified Green Businesses (for catering, printing, vehicle repair, landscapers and others listed at www.greenbiz.abag.ca.gov) or vendors using environmentally preferable practices. Please give examples:	2	Yes	2	No	0
Buy low-emission building materials, carpets, furniture, etc. for remodeling projects. Please give examples:	3	Yes	3	Yes	2
PEST MANAGEMENT	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Use or specify in landscaping contracts the use of least toxic pest control methods and products to reduce or eliminate the use of chemical pesticides.	2	Yes	2	Yes	2
Correct situations that attract and harbor pests with proper food and garbage storage and improved landscaping.	1	Yes	1	Yes	1
Use pest resistant plants.	1	No	0		
Use pest traps, baits and barriers.	1	Yes	1	Yes	1
Use less toxic pesticides such as soaps, oils, and microbials and apply on an "as needed" basis.	1	Yes	1	Yes	1
If chemical pesticides are necessary, use those labeled "caution" rather than "warning" or "danger".	1	Yes	1	Yes	1
Add plants to your landscape that attract beneficial, predatory insects. Let nature take care of pest control.	2	No	0		
Fill your garden with a variety of plant species. A diverse landscape makes it difficult for one type of pest to take over.	3	Yes	3	Yes	2

Add native plants and/or leave a wild corner in your landscape to attract birds and other small wildlife that will prey on pests.	3	No	0		

FACILITIES MAINTENANCE, HAZARDOUS WASTE AND STORM WATER RUNOFF	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Store any potentially hazardous materials securely, control access and rotate stock to use oldest material first.	2	Yes	2	Yes	2
Label all storm water drains with "no dumping" message.	1	Yes	1	No	0
Wash cars, equipment, floor mats or other items where wash water can be directed to a sewer drain, instead of an outside storm drain.	1	No	0		
Clean parking lots by sweeping or using equipment that collects dirty water (disposed to sanitary sewer).	1	No	0		
Keep dumpsters covered when not in use.	1	Yes	1	Yes	1
Keep receiving areas, parking, landscape and dumpster areas clean and free from litter, oil drips and debris.	1	Yes	1	Yes	1
Mulch, use ground cover, or use a barrier to prevent exposed soil in landscaped areas from washing into storm drains.	2	Yes	2	Yes	2
Store deliveries and supplies under a roof.	1	Yes	1	Yes	1
Keep litter, debris and soil away from storm drains and clean private catch basins at least once a year, before the first rain.	2	No	0		
If company owns any vehicles, routinely check for leaks and establish a "ground staining" inspection routine.	2	Yes	2	No	0
Prevent erosion during all landscape, construction or other activities.	2	No	0		
Keep a spill kit handy to catch and/or collect spills from leaking vehicles.	1	Yes	1	Yes	1
Post signs at trouble spots (loading docks, dumpster areas, water hoses, etc.) describing proper practices.	1	Yes	1	No	0
Contract for or install green energy sources, such as solar or wind power.	4	Yes	4	No	0
RECYCLE HAZARDOUS WASTE PRODUCTS	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Spent toner and ink-jet cartridges	2	Yes	2	Yes	1

Spent fluorescent lamps	2	yes	2	yes	2
Batteries that cannot be recharged and reused	2	yes	2	No	0
Paints, solvents, etc.	2	yes	2	yes	1
Electronic equipment	2	yes	2	yes	1
REDUCE AIR POLLUTION FROM VEHICLES	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Join the local "Spare the Air" program. Notify employees of "Spare the Air" days and what they can do to help out.	1	yes	1	No	0
Help encourage commute alternatives by informing employees, customers and others who visit your office about transportation options for reaching your location. Post transit schedules and routes.	1	yes	1	yes	0
Help employees rideshare by posting commuter ride sign-up sheets, employee home zip code map, etc. Get assistance from www.rides.org or 1-800-755-POOL.	2	yes	2	yes	1
Offer telecommuting opportunities and/or flexible schedules so workers can avoid heavy traffic commutes.	2	yes	2	yes	1
When possible, arrange for a single vendor who makes deliveries for several items.	1	yes	1	No	0
Patronize services close to your business (food, copy center, etc.) and encourage employees to do the same.	1	yes	1	No	0
Convert company vehicles to Low Emission Vehicles (electric, hybrid or alternative fuels—natural gas, methanol, biodiesel, etc.)	4	yes	4	No	0
Keep company vehicles well maintained to prevent leaks and minimize emissions, and encourage employees to do the same.	2	yes	2	yes	2
Provide car/van pool parking.	1	yes	1	yes	1
Sell bus or light rail passes on-site or at a discount to your employees.	1	yes	1	No	0
Offer a shuttle service to and from bus, train and/or light rail stops.	2	yes	2	No	0
Provide shower facilities for employees who walk/jog/bike to work or contract with an athletic club to use their facilities.	1	yes	1	yes	1
Encourage bicycling to work by offering rebates on bicycles bought for commuting.	2	yes	2	No	0
Provide secured and enclosed bicycle parking for employees (e.g., bike lockers)	1	yes	1	yes	1

OTHER ACTIVITIES *Please describe additional activities and assign points. This will be reviewed by GHC Team.*	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
TOTAL					

	TOTAL of Your Possible Points	**TOTAL of Your Score**	**SECTION SCORE**
POLLUTION PREVENTION	86	36	42%

TELEOSIS

HEALTHY PEOPLE

EDUCATING STAFF & CLIENTS	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Provide on-going incentives or training opportunities to encourage staff participation in greening your office:					
Incorporate Green Office goals and needs into performance appraisals, job descriptions, training programs, and employee orientations.	3	Yes	3	No	0
Discuss Green Office initiatives regularly in staff meetings.	3	Yes	3	No	0
Provide Green Health Care and Green Business materials in reception and staff areas.	2	Yes	2	No	0
Include information about your Green Office in your newsletters or bulletins.	2	Yes	2	No	0
Create a suggestion and reward program for your employees.	2	Yes	2	No	0
Inform your clients about your environmental efforts and what you are doing to meet the Green Health Care and Green Business standards:					
Post the Teleosis and Green Business signs and certificates in a visible location.	1	No	0		
Post steps you are taking to be a Green Office.	2	Yes	2	No	0
Create a self-guided Green Office Tour for your clients and visitors. Post signs in each room of the office pointing out some of the green features.	3	Yes	3	No	0
Speak regularly with your clients about your Green Office practices.	2	Yes	2	No	0

Highlight your Green Business efforts and/or certification on your website, and link it to the Green Business and Teleosis websites.	3	Yes	3	No	0
Track and post rates of water and energy usage and solid and hazardous waste generation.	2	Yes	2	No	0
Introduce another health professional to the Green Health Care and Green Business Programs. Encourage them to participate and provide their contact information to Teleosis and GBP.	2	Yes	2	No	0
PHYSICAL HEALTH	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Offer a scent-free environment to protect chemically-sensitive staff and clients. Post "scent-free" signs.	2	Yes	2	No	0
Make your office accessible to people with wheelchairs and walkers. Consider a ramp beside any steps, railings in the bathroom, and adequate spacing in the waiting area and treatment rooms.	4	Yes	4	Yes	4
Where possible, have windows that open to allow more fresh air circulation when outdoor temperatures are moderate.	2	Yes	2	No	0
Provide ventilation system and monitoring to ensure employee comfort and wellbeing.	2	Yes	2	Yes	2
Inquire about and take note of people's state of health in the office. Notice any recurring symptoms (such as headaches, fatigue, or nausea), especially if they coincide with changes in the office environment (such as new carpeting or new HVAC system) which may be contributing to ill health.	4	Yes	4	No	0
To prevent mold and mildew, which can contribute to ill health:					
Repair all water leaks as soon as possible.	1	Yes	1	Yes	1
Vent moisture from the bathroom and/or kitchen with an exhaust fan.	2	Yes	2	Yes	1
Maintain humidity levels below 50% with an electric or natural gas dehumidifier.	3	Yes	3	Yes	2
Insulate cold pipes with visibly damp exteriors.	2	Yes	2	Yes	1
To minimize electromagnetic frequency exposure, which can negatively impact people's health:					
Use corded telephones to make most calls. Use cellular phones for back-up only.	1	Yes	1	Yes	1
Upgrade computer monitors to those of TCO standards (www.tco-info.com) or to those that measures under 1 mG one foot from the monitor or at your body.	2	Yes	2	Yes	1
Plug computers into a grounded 3-holed outlet.	2	Yes	2	Yes	2

Electric meters, panels, subpanels, and transformers are powerful EMF emitters. Avoid placing workstations near these areas.	3	Yes	3	Yes	3

PSYCHO-SOCIAL HEALTH	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Make your office feel welcoming and healing for clients, staff, and yourself. Have plants, pleasant decorations, comfortable chairs, and soft music throughout the office. Personal touches such as an assortment of herbal teas and colorful mugs, magazines on health and environmental themes, and cloth towels (in bathroom) are especially inviting.	4	Yes	4	No	0
Provide building employees with connection between indoor spaces and the outdoors by introducing daylight and views into the buildings regularly occupied areas.	3	Yes	3	Yes	1
Make work areas as pleasant as possible. Place desks in view of a window. Provide desk lamps and allow staff to play soft music at their workstations.	2	Yes	2	No	0
Make the kitchen and/or staff lounge feel friendly and inviting. Having a kettle to boil water, a small refrigerator to store lunches, re-usable dishes and cutlery, and comfortable places to sit all promote healthy habits for eating and relaxation.	2	Yes	2	No	0
Encourage yourself and your staff to prepare and bring healthy lunches. Food prepared at home is healthier and less expensive than grabbing something at the nearest lunch spot. Packed lunches in reusable containers save on disposable, take-out packaging.	2	Yes	2	No	0
Encourage your staff and yourself to take breaks from work. Get up and stretch. Go for a walk to get some fresh air. Go out for lunch as a special, social occasion, instead of a rushed daily affair.	2	Yes	2	No	0
Create a tranquil space for quietness and reflection in the office. Allow staff and clients to use this space to promote relaxation and good health.	2	Yes	2	No	0
Understand and value each staff person's role in your organization. Develop open and honest communication about what is working and what needs attention to promote a healthy, happy, and balanced work environment.	2	Yes	2	Yes	0
Value your relationships with your clients. Develop open and honest communication with clients and encourage their feedback.	2	Yes	2	Yes	1
Conduct periodic check-in's where staff can openly discuss internal office issues and any changes and improvements they would like to see. Offer tools and guidelines for clear communication in discussions and around conflict.	2	Yes	2	Yes	1
Offer adequate sick leave, vacation time, and paid time-off. Encourage staff to take time for self-care and family needs.	2	Yes	2	Yes	2
Encourage non-work-related staff events, such as dinners or hikes, to promote community.	1	Yes	1	Yes	1

OTHER ACTIVITIES *Please describe additional activities and assign points. This will be reviewed by GHC Team.*	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
TOTAL					

	TOTAL of Your Possible Points	**TOTAL of Your Score**	**SECTION SCORE**
HEALTHY PEOPLE	72	24	32%

MEDICAL TECHNOLOGY

WASTE SEGREGATION & REGULATED MEDICAL WASTE REDUCTION	Possible Points	A) Does it apply to you?	B) Your Possible Points	C) Did you do it?	D) Your Score
Conduct survey to determine if staff comprehends Regulated Medical Waste definitions.	2	Yes	2	No	0
Conduct general medical waste management training including handling and disposal procedures.	3	Yes	3	Yes	3
Define the problem and develop a cost/benefit analysis	3	Yes	3	No	0
Analyze waste treatment and waste hauling procedures (understand how your waste is treated and consider treatment technologies, i.e. reduce or eliminate incineration for solid and infectious waste).	2	Yes	2	Yes	1
Implement waste segregation practices for medical waste.	2	Yes	2	No	0
Use separate color-coded and labeled RMW collection containers (e.g., red bags and sharps containers).	2	Yes	2	Yes	2
Post signs at RMW disposal locations outlining what types of waste are to be disposed of as RMW. Use multiple languages, if necessary, for optimal communication.	2	Yes	2	Yes	1
Minimize or eliminate the generation of waste at the source itself through techniques such as product substitution, technology change and good operating practices.	1	Yes	1	No	0

Survey the facility to determine waste generation rates for specific areas, and provide containers of the right size to match those needs.	2	Yes	2	No	0
Maximize container use by optimizing when they are replaced (i.e., don't unnecessarily remove half full or less containers).	2	Yes	2	Yes	1
Where RMW containers are used, also provide regular waste containers to ensure that employees are making a conscious disposal and segregation decision.	2	Yes	2	Yes	2
Cover red bag containers to reduce solid waste that is casually tossed in	2	Yes	2	Yes	1
Remove red bags in areas where RMW is not generated.	2	Yes	2	No	0
Use a reusable sharps container system	2	Yes	2	Yes	2
Ship RMW off-site in reusable containers. These may be available from your RMW waste services provider and/or disposal facility.	2	Yes	2	No	0
Track your progress, report successes and create rewards program for staff!	1	Yes	1	No	0
MERCURY SAFETY	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Complete a Mercury audit in the office and label all mercury containing devices.	3	Yes	3	No	0
Implement a mercury-free purchasing policy.	3	Yes	3	Yes	2
Take the Health Care Without Harm "Making Medicine Mercury Free Pledge"	2	Yes	2	No	0
Develop and implement Mercury management policies that include:					
Protocol for safe handling	2	Yes	2	Yes	1
Mercury spill clean up procedures	2	Yes	2	Yes	2
Disposal procedures such as regulated safe disposal or recycling to avoid disposal in waste stream Create office policy for mercury reduction and elimination	2	Yes	2	Yes	2

Educate and train your employees about facility protocols, including information about mercury and its effects on human health and the environment.	2	Yes	2	Yes	2
Conduct mercury training and spill procedures with employees.	3	Yes	3	Yes	3
Replace mercury containing thermometers with digital or liquid crystal thermometers.	1	Yes	1	Yes	1
Replace mercury-containing blood pressure units with aneroid units.	2	Yes	2	Yes	2
Replace mercury-containing cantors tubes, dilators and others	3	Yes	3	Yes	3
Replace Mercury containing lab chemicals with non-Mercury alternatives.	2	Yes	2	Yes	2
Create office policy to ban purchase of Mercury containing products in office	2	Yes	2	Yes	2
Designate a Mercury reduction committee with point person to manage process and serve as primary contact.	2	Yes	2	No	0
Manage and recycle fluorescent light bulbs	2	Yes	2	Yes	2
Implement battery collection program	3	Yes	3	Yes	1
Hold a mercury thermometer exchange event at your facility	3	Yes	3	No	0
Discontinue sending mercury thermometers home with patients especially parents of newborns.	2	Yes	2	Yes	2

PVC SAFETY	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**
Conduct audits to identify PVC and DEHP products	3	Yes	3	Yes	1
Create and implement PVC-free policy in workplace	4	Yes	4	No	0
Replace the following with PVC/ DEHP free alternatives:					

BLOOD PRODUCTS AND TRANSFUSIONS					
Aphaeresis circuits	3	Yes	3	No	0
Blood bags and tubing circuits	3	Yes	3	No	0
Extracorporeal membrane oxygenation	3	Yes	3	No	0
COLLECTION OF BODILY FLUIDS					
Dialysis, peritoneal: drainage bags	3	Yes	3	No	0
Urinary collection bags, urological catheters, and irrigation sets	3	Yes	3	No	0
Wound drainage systems: bags and tubes	3	Yes	3	No	0
ENTERAL FEEDING PRODUCTS					
Nasogastric tubes	3	Yes	3	No	0
Enteral feeding sets (bags and tubing)	3	Yes	3	No	0
Tubing for breast pumps	3	Yes	3	No	0
INTRAVENOUS (IV) THERAPY PRODUCTS					
Catheters	3	Yes	3	No	0
Solution bags	3	Yes	3	No	0
Tubing	3	Yes	3	No	0
KIDNEY (RENAL DISEASE) THERAPY PRODUCTS					
Hemodialysis: blood lines (tubing) and catheters	3	Yes	3	No	0

Peritoneal dialysis: dialysate containers (bags) and fill and drain lines (tubing)	3	Yes	3	No	0
PACKAGING, MEDICAL PRODUCTS					
Film wrap	1	Yes	1	No	0
Thermoformed trays for admission and diagnostic kits, and medical devices	2	Yes	2	No	0
PATIENT PRODUCTS					
Bedpans	2	Yes	2	No	0
Cold and heat packs and heating pads	2	Yes	2	No	0
Foot orthoses	3	Yes	3	No	0
Inflatable splints and injury support packs	2	Yes	2	No	0
Patient ID cards and bracelets	2	Yes	2	No	0
Sequential compression devices	2	Yes	2	No	0
Replace PVC containing products with PVC-free alternatives:					
Flooring	2	Yes	2	No	0
Furniture coverings	2	Yes	2	No	0
Wall coverings	2	Yes	2	No	0
Window shades and blinds	2	Yes	2	No	0
Doors	2	Yes	2	No	0
Windows	2	Yes	2	No	0
OFFICE SUPPLIES					
Notebook binders	1	Yes	1	No	0

Plastic dividers	1	Yes	1	No	0
Notebooks	1	Yes	1	No	0
Account Books	1	Yes	1	No	0
Business Card Holders	1	Yes	1	No	0
Computer Dust Covers	1	Yes	1	No	0
Computer Bags	1	Yes	1	No	0
Erasers	1	Yes	1	No	0
Duct Tape	1	Yes	1	No	0
Guest Chairs	3	Yes	1	No	0
ID Badges and Holders	1	Yes	1	No	0
Media Storage Sleeves and Pages	1	Yes	1	No	0
Paper Clips	1	Yes	1	No	0
PDA Binder	1	Yes	1	No	0
Report Covers	1	Yes	1	No	0
Self-Adhesive Pockets	1	Yes	1	No	0
Sheet Protectors	1	Yes	1	No	0
OTHER ACTIVITIES *Please describe additional activities and assign points. This will be reviewed by GHC Team.*	**Possible Points**	**A) Does it apply to you?**	**B) Your Possible Points**	**C) Did you do it?**	**D) Your Score**

TOTAL					

	TOTAL of Your Possible Points	**TOTAL of Your Score**	**SECTION SCORE**
MEDICAL TECHNOLOGY	157	47	30%

TELEOSIS

OVERALL SCORE

SECTION	TOTAL of Your Possible Points	TOTAL of Your Score	OVERALL Score
SOLID WASTE REDUCTION & RECYCLING	102	26	
ENERGY CONSERVATION	70	16	
WATER CONSERVATION	46	12	
POLLUTION PREVENTION	86	36	
HEALTHY PEOPLE	72	24	
MEDICAL TECHNOLOGY	157	47	
GRAND TOTAL	533	163	31%

Overall Score is: 31 %

0-59% NEEDS IMPROVEMENT
60-74% GHC BRONZE STAR
75-89% GHC SILVER STAR
90-100% GHC GOLD STAR